

CLAIMS

1. A coin sorting apparatus for sorting coins of at least three denominations, comprising:

presorting means for broadly sorting the coins by size into those of at least two groups; and

main sorting means for sorting by denomination the coins of the respective groups sorted by the presorting means.

2. The coin sorting apparatus according to claim 1, wherein the presorting means comprises:

a stationary member provided with a central coin-feed opening; and

a rotary disk supported for rotation and disposed under the stationary member closely adjacent to the lower surface of the stationary member,

the presorting means being constructed such that coins fed into the coin-feed opening of the stationary member slide along the lower surface of the stationary member as the rotary disk rotates, and

the stationary member being provided with guide structures for selectively guiding the respective groups of coins sliding along the lower surface thereof.

3. The coin sorting apparatus according to claim 1 or 2, wherein the main sorting means comprises:

a guide passage for substantially horizontally guiding coins to be sorted, one by one;

conveying means for conveying the coins along the guide passage; and

a plurality of sorting units each for sorting out coins of one of the denominations, arranged at intervals along the guide passage.

4. A coin receiving system for sorting coins of at least three denominations and executing a money receiving management for the coins, the coin receiving system comprising:

presorting means for broadly sorting the coins by size into those of at least two groups;

coin identifying means for identifying the coins of each of the groups formed by broadly sorting the coins by the presorting means;

rejecting means for rejecting coins that could not be identified by the coin identifying means;

main sorting means for sorting, by denomination, the coins of the respective groups identified by the coin identifying means; and

money receiving means for counting the amount of money represented by the coins identified by the coin identifying means, to receive the money.

5. The coin receiving system according to claim 4 further comprising different coin sorting means for sorting out different coins that have been identified as coins of different denominations from those of coins capable of being sorted by the main sorting means, by the coin identifying means.

6. The coin receiving system according to claim 5, wherein the coin identifying means is adapted to identify the different coins, and the money receiving means is adapted to receive the coins to be sorted by the main sorting means and the different coins to be sorted by the different coin sorting means.

7. A coin sorting apparatus comprising:

a stationary member provided with a central coin-feed opening; and

a rotary disk supported for rotation, disposed under the stationary member and being closely adjacent to the lower surface of the stationary member;

the coin sorting apparatus being constructed such that coins fed into the coin-feed opening of the stationary member slide along the lower surface of the stationary member as the rotary disk rotates,

wherein the stationary member is provided with guide structures for selectively guiding coins sliding along the lower surface thereof, according to the diameters of the coins, and

the guide structures has a coin passage formed in the lower surface of the stationary member and having a radial inner edge portion configured to engage outer edges of all the coins, and at least one coin-sorting guide,

the coin-sorting guide having:

a step formed such that a peripheral part of each of coins having diameters greater than a reference diameter run up onto the step, with the outer edge thereof engaging the radial inner edge portion of the coin passage; and

an ejecting passage for guiding the coin that has run up onto the step and ejecting the same coin outside the stationary member.

8. The coin sorting apparatus according to claim 7, wherein the coin passage has radial inner and outer edges configured to engage outer edges of coins moving along the coin passage, and

the coin passage is configured to curve such that an upstream section thereof on the upstream side of the step extends away from a center of the stationary member, and that a downstream section thereof on the downstream side of the step extends to approach the center of the stationary member toward the downstream side.

Sub a27 9. The coin sorting apparatus according to claim 7 or 8, wherein a pressing means for pressing the coins toward the radial inner edge of the coin passage is disposed in the upstream section of the coin passage on the upstream side of the step.

10. The coin sorting apparatus according to claim 7 or 8, wherein the guide structures of the stationary member are constructed so that the coin that has run up onto the step lies in a substantially horizontal position.

11. The coin sorting apparatus according to claim 7 or 8, wherein the guide structures of the stationary member include a step-forming plate forming the step and are movable along a width of the coin passage for positional adjustment.

12. The coin sorting apparatus according to claim 7 or 8, wherein a foreign matter sorting means is disposed in

the downstream section of the coin passage for selectively guiding a foreign matter having a thickness smaller than that of the thinnest coin so that the foreign matter is ejected outside the stationary member.

13. The coin sorting apparatus according to claim 12, wherein the foreign matter sorting means has:

a foreign matter passage formed in the stationary member and branching away from the coin passage to an outside of the stationary member; and

a gate portion formed at a junction of the coin passage and the foreign matter passage, together with the rotary disk defining a gap of such a size as allow the foreign matter to pass but not the thinnest coin.

14. A coin sorting apparatus comprising:

a stationary member provided with a central coin-feed opening; and

a rotary disk supported for rotation, disposed under the stationary member closely adjacent to the lower surface of the stationary member, and having a disk body and a resilient member attached to an upper surface of the disk body;

the coin sorting apparatus being constructed such that coins fed into the coin-feed opening of the stationary member slide along the lower surface of the stationary member as the rotary disk rotates,

wherein the stationary member is provided with guide structures for selectively guiding coins sliding along the lower surface thereof, according to their diameters, and

the resilient member of the rotary disk has a urethane rubber layer having a surface provided with a plurality of radial grooves.

15. The coin sorting apparatus according to claim 14, wherein circumferential intervals between the radial grooves at the periphery of the resilient member are smaller than a diameter of the smallest coin.

5w937 16. The coin sorting apparatus according to claim 14 or 15, wherein the urethane rubber layer of the resilient

member is formed of a thermoplastic urethane rubber.

17. The coin sorting apparatus according to claim 14 or 15, wherein the resilient member has a porous resilient layer underlying the urethane rubber layer.

18. The coin sorting apparatus according to claim 17, wherein the porous resilient layer is formed of rubber sponge.

Subcut 19. The coin sorting apparatus according to claim 14 or 15, wherein a part of at least one of the radial grooves of the urethane rubber layer is configured to have a depth shallower than other parts of the same groove so as to serve as an indicator.

20. The coin sorting apparatus according to claim 14 or 15, wherein a metal plate, detachable from the disk body, is fixed to the lower surface of the resilient member.

21. A coin sorting apparatus comprising:

a passage member having a substantially horizontal passage surface and provided with an ejecting hole;

a guide member extended on the passage surface of the passage member to guide coins along the passage surface from the upstream side toward the downstream side of the passage member;

a conveyor belt extended so as to hold coins together with the passage surface of the passage member to convey coins along the guide member from an upstream side toward a downstream side of the passage member; and

a support roller disposed under the ejecting hole opposite to the conveyor belt;

wherein the ejecting hole of the passage member is contiguous with the guide member and has a guiding side wall extending obliquely away from the guide member toward the downstream side of the passage member, and

the support roller is adapted to be turned between a coin-passing position where the upper end thereof is at a level not lower than that of the upper edge of the guiding side wall, and a coin-ejecting position where the upper end thereof is at a level lower than that of the upper edge of the guiding side wall.

22. The coin sorting apparatus according to claim 21, wherein the support roller includes:

a support shaft supported for rotation substantially in parallel to the passage surface and substantially perpendicularly to a conveying direction in which coins are conveyed,

an eccentric member eccentrically mounted on the support shaft to have a major-radius section and a minor-radius section, and

a free roller member mounted for free rotation on the circumference of the eccentric member.

23. The coin sorting apparatus according to claim 21 or 22 further comprising:

a coin identifying means for identifying coins, disposed in a position corresponding to the upstream side of the ejecting hole of the passage member; and

a controller for changing the position of the support roller between the coin-passing position and the coin-ejecting position, depending on the result of identification by the coin identifying means.

24. The coin sorting apparatus according to claim 21 or 22 further comprising a pressure roller adapted to press the coin through the conveyor belt against the support roller to hold the coin between the conveyor belt and the support roller.

25. A coin receiving system comprising:

coin feed means for feeding mixed coins including new coins of a new currency unit and old coins of an old currency unit one by one;

coin identifying means for identifying the coins fed by the coin feed means by denomination;

a new coin holding unit for temporarily holding the new coins;

an old coin holding unit for temporarily holding old coins;

a sorting means for sorting the new coins from the old coins and delivering the new coins to the new coin holding

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unit and the old coins to the old coin holding unit;

a new coin storing unit for storing the new coins received from the new coin holding unit;

an old coin storing unit for storing the old coins received from the old coin holding unit;

counting means for counting a total amount of money in the new currency unit and a total amount of money in the old currency unit, on the basis of results of identification by the coin identifying means;

arithmetic means for converting the total amount of money in the old currency unit into a converted amount of money as a corresponding total amount of money in the new currency unit, by using a predetermined exchange rate, and calculating a sum total amount of money in the new currency unit by adding the total amount of money in the new currency unit and the converted amount of money together;

display means for displaying information of the total amount of money in the new currency unit, the total amount of money in the old currency unit, the converted amount of money, and the sum total amount of money in the new currency unit;

accepting-instruction means for giving an accepting instruction to receive money according to the information displayed by the display means; and

money receiving means for storing the new and old coins that have been temporarily reserved in the new and old coin holding units, in the new and old coin storing units, respectively, in response to the accepting instruction provided by the accepting-instruction means, and receiving money for the sum total amount of money in the new currency unit.

26. The coin deposit system according to claim 25 further comprising:

printing-instruction means for providing an accepting instruction for the accepting-instruction means, and providing a printing instruction; and

printing means for printing out at least part of the

information displayed by the display means, in response to the printing instruction provided by the printing-instruction means.

Sub art 27. The coin deposit system according to claim 25 or 26, wherein the sorting means is adapted to sort the new coins by denomination and sort out the old coins regardless of denomination,

the new coin holding unit and the new coin storing unit have divisions respectively for holding temporarily and storing the new coins sorted by denomination, and

the old coin holding unit and the old coin storing unit are adapted to reserve temporarily and store the old coins of mixed denominations.

added art